R E P O R T R E S U M E S

ED 018 837 CG 001 858

THE CONSTRUCTION AND VALIDATION OF A MEASURE OF VOCATIONAL MATURITY.

BY- WESTBROOK, BERT W. CLARY, JOE R.
NORTH CAROLINA UNIV., RALEIGH, N.C. STATE UNIV.

REPORT NUMBER COE-RP-8-A PUB DATE NOV 67
EDRS PRICE MF-$0.25 HC-$2.28 55P.

DESCRIPTORS- *RESEARCH PROJECTS, *RESEARCH DESIGN, *VOCATIONAL DEVELOPMENT, MEASUREMENT INSTRUMENTS, *MATURITY TESTS,

THIS REPORT DEALS WITH THE ORGANIZATION, RATIONALE, METHODS AND EXPECTED END-PRODUCTS OF A RESEARCH PROJECT (SCHEDULED FOR COMPLETION ON JUNE 23, 1970) FOR THE CONSTRUCTION AND VALIDATION OF A RELIABLE VOCATIONAL MATURITY MEASURE (VMM). THE PROJECT'S EIGHT PHASES AND ACTIVITIES ARE EXPLAINED. THE PROJECT ASSUMES--(1) THE INDIVIDUAL AND SOCIETY AS A WHOLE SUFFER FROM UNWISE EDUCATIONAL AND VOCATIONAL CHOICES, (2) THESE CHOICES ARE RELATED TO VOCATIONAL MATURITY, AND (3) A NEED EXISTS FOR BETTER MEASURES OF VOCATIONAL MATURITY. THE PROJECT STAFF WILL ADMINISTER, TO REPRESENTATIVE SAMPLES OF SOUTHERN PUBLIC SCHOOL PUPILS IN GRADES EIGHT-12, THREE TESTS--(1) THE TRYOUT FORM OF THE VMM, (2) THE PRELIMINARY FORM, AND (3) THE FINAL FORM. AFTER ALL THE DATA IS ANALYZED, A FINAL REPORT WILL GIVE AN ACCOUNT OF THE PROJECT AND WILL INCLUDE THE VMM, AN ADMINISTRATOR'S MANUAL, AND A TECHNICAL MANUAL OF NORMATIVE DATA FOR THE VMM. IT IS EXPECTED THAT THE VMM WILL AID IN--(1) EVALUATING EDUCATIONAL PROGRAMS WHICH INCLUDE VOCATIONAL EXPLORATION AS A MAJOR COMPONENT, (2) INCREASING UNDERSTANDING OF THE CONSTRUCT OF VOCATIONAL MATURITY, (3) IDENTIFYING PUPILS WHO NEED SPECIAL ASSISTANCE IN VOCATIONAL DEVELOPMENT, AND (4) EVALUATING PROGRAMS DESIGNED TO PROVIDE STUDENTS WITH VOCATIONAL EXPLORATORY EXPERIENCES. (RD)

ED018837

PROJECT VIII A of the Center for occupational Education

RESEARCH ~~PROPOSAL~~

THE CONSTRUCTION AND VALIDATION OF A MEASURE OF VOCATIONAL MATURITY

Bert W. Westbrook
Joe R. Clary

This research proposal was developed as part of the research program of the Center for Occupational Education located at North Carolina State University at Raleigh, Raleigh, North Carolina, in cooperation with the Division of Adult and Vocational Research, Bureau of Research, U. S. Office of Education.

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY.

Center for Occupational Education
North Carolina State University
Raleigh, North Carolina
June, 1967
Revised November, 1967

CG 001 858

TABLE OF CONTENTS

	Page
INTRODUCTION	
Statement of the Problem	1
Review of Related Literature	3
Rationale of the Project	22
Objectives of the Project	24
THE METHOD	
Population and Sample	25
Design of the Project	26
Data and Instrumentation	31
Analysis of the Data	41
Expected End-Products	42
Time Schedule	43
Personnel	44
References	47
APPENDIX A	
PERT Network	50

INTRODUCTION

Statement of the Problem

The public school systems in our country are so organized that certain educational and vocational decisions have to be made at the end of the junior high school or at the beginning of high school. The individual student usually has to decide among different curricula, such as college preparatory, general, or vocational. Students must make other decisions such as whether to remain in high school, whether to change curricula, or whether to continue education beyond high school. The educational decisions required of a youngster during adolescence have an important bearing on his later occupational history by limiting his future educational and vocational choices. The student who drops out of high school and marries at an early age may never complete high school and prepare for a profession. The student who completes the college preparatory curriculum but never enters college may not have the financial resources to obtain technical or vocational training which he could have received without cost in high school. The student who enters an inappropriate occupation and works at it for a number of years may find it difficult to retrain for an appropriate occupation in later life. Although some unwise educational and vocational choices may be corrected at a later stage in life, the individual and society suffer when educational or vocational floundering results in an unnecessary waste of time and resources.

Unwise educational and vocational choices are believed to be related to vocational maturity, a construct which has been suggested, defined,

and measured by Super and Overstreet (1960). Vocational maturity is conceptualized as readiness for vocational decision-making, planning, and implementation; it is the ability to cope with the vocational developmental tasks appropriate to a life stage. The pioneer work of Donald E. Super (1957) and his associates at Teachers College has stimulated vocational maturity research by Crites (1965), Tiedeman and O'Hara (1963), and Gribbons and Lohnes (1966). Additional projects have recently been launched at the University of Southern California (Ilah M. Wilstach), the University of Arizonia (Robert A. Heimann), and The Western Behavioral Sciences Institute (Gary Shirts). Although a number of significant advances have been made in theory and in methods of assessing vocational maturity, the vocational maturity measures which have been developed are still time-consuming to use or of dubious validity, needing refinement and further validation (Super, 1967). The available measures of vocational maturity are relatively crude and emphasize the need for additional methods of evaluating the readiness of youth for prevocational and vocational decisions. Furthermore, the lack of valid instruments for measuring vocational maturity objectively has forced vocational guidance counselors to rely upon their own judgment to determine an individual's readiness for vocational planning.

In addition to the need for a measure to assess readiness for vocational decision-making, refined methods are needed for evaluating the outcomes of vocational education. For example, although the exploratory function of vocational education is widely accepted and occupational information units are readily incorporated in the school curricula, appropriate criteria and methods for evaluating the outcomes of exploratory programs are difficult to establish. A measure of vocational maturity

may prove to be valuable in evaluating some of the outcomes of vocational education as well as in assessing an individual student's readiness for vocational decision making.

The need for a valid measure of vocational maturity seems apparent. The goal of this project is to develop a reliable and valid measure of vocational maturity which can be used by the working counselor in a practical setting or by the research worker in evaluating educational programs which include vocational exploration as a major component.

A Review of Related Literature

A selected review of the pertinent literature is presented in this subsection of the proposal. The selective literature and the previous research studies provide a foundation for the project. Because of their key role in the project, the concept and measurement of vocational maturity are discussed in considerable detail.

The concept of vocational maturity

Super's concept of vocational maturity.--Super has defined vocational maturity as a construct which indicates "the place reached on the continuum from exploration to decline" (Super, 1955, p. 135). The nature of this construct has been the source of much interest and study since it was first delineated in 1955 by Super who described five dimensions along which vocational behavior might mature during early adolescence and for which measures could be devised (Super, 1955). The five dimensions are orientation to vocational choice, information and planning, consistency of vocational choice, crystallization of traits, and wisdom of vocational choice.

"Orientation to vocational choice" is defined as concern with the problem of vocational choice, and use of resources in solving the problem. Orientation to vocational choice is measured in the Career Pattern Study (Super and Overstreet, 1960) by judges' ratings of interview protocols.

"Information and planning" is defined as specificity of information about the chosen occupation, and the extent and specificity of planning with respect to the chosen occupation. It was measured by judges' ratings of interview protocols.

"Consistency of vocational goals" is defined as stability of vocational choice over time, and agreement among vocational choices in field, level, and family. It is measured by discrepancies between vocational choices elicited on different occasions and classified into different cells of Roe's (1956) occupational classification scheme.

"Crystallization of traits" is defined as the extent to which vocationally relevant aptitudes and personal dispositions, such as mechanical comprehension and work values, have developed toward adult status. It is measured by ratings of interview protocols and by standardized tests.

"Wisdom of vocational choice" is defined as the extent to which vocational choice agrees with abilities, activities, interests, and socioeconomic background. It is measured by discrepancies between vocational choice and indices of various reality factors.

As vocational maturity is conceived by Super, the selection of an occupation is only one of several factors which constitute vocational maturity. The construct also includes attitudes toward decision-making, comprehension and understanding of job requirements, planning activity and ability, and development of vocational capabilities.

Crites' concept of vocational maturity.--Crites has defined vocational maturity as "the maturity of an individual's vocational behavior as indicated by the similarity between his behavior and that of the oldest individuals in his vocational life stage." (Crites, 1965, p. 259). Crites has elaborated on Super and Overstreet's concept of vocational maturity by proposing that the "orientation to vocational choice," "information and planning," and some of the "crystallization of traits" dimensions can be further analyzed into several different kinds of choice "competencies" and "attitudes." Choice competencies are cognitive in nature and involve mental processes such as resolving conflicts between alternative courses of action, establishing future goals,and relating means to ends through planning. Choice attitudes are in the affective domain and refer to involvement in the choice process, orientation toward work, independence in decision making, preference for choice factors, and conceptions of the choice process.

Crites has arranged four dimensions of vocational maturity into a model which theoretically comprises the construct of vocational maturity (Crites, 1965, p. 5). The model is shown in Figure 1 and consists of the following dimensions: (1) Consistency of vocational choice, (2) Wisdom of vocational choice, (3) Vocational choice competencies, and (4) Vocational choice attitudes. The first level of the construct is considered to be a general factor and has been defined as the "degree of vocational development."

The four dimensions of vocational maturity represent group factors which are somewhat independent and which are defined by four or five variables in each dimension. The variables included in the model are basically the same constructs developed by Super and Overstreet in

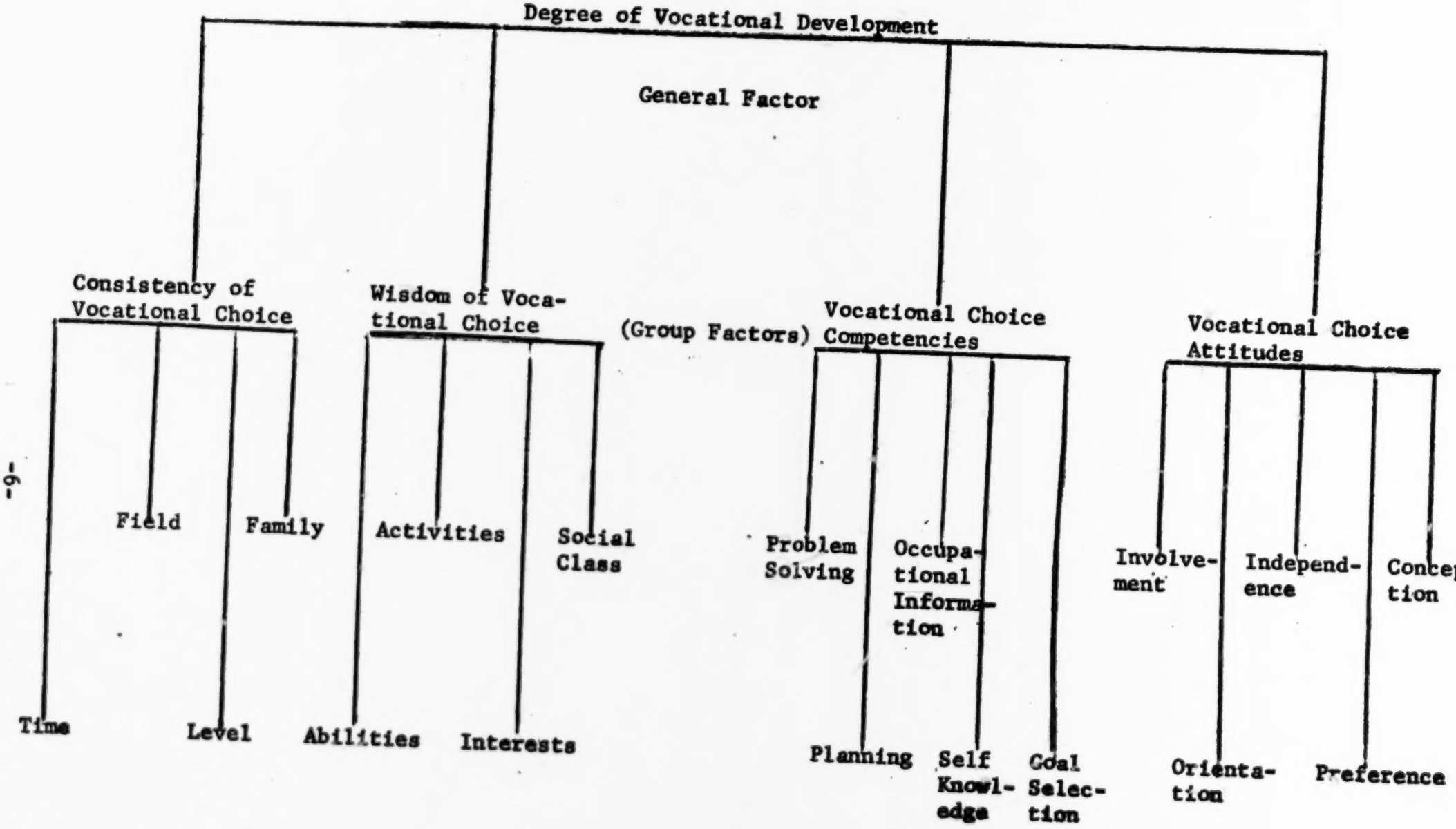


Figure 1. The Construct of Vocational Maturity (Crites, 1965, p. 5).

the Career Pattern Study (1960). Under the dimension "Consistency of Vocational Choice" Crites has grouped "field," "family," "level," and "time." Each of these indices except "time" was included in Super's "Consistency of Vocational Preferences" dimension. Crites' "Wisdom of Vocational Preferences" which included ability, interests, and socioeconomic variables. Crites has taken variables from three dimensions which Super used (Orientation to Vocational Choice, Information and Planning, and Crystallization of Traits) and arranged them into two dimensions called "Vocational Choice Competencies" and "Vocational Choice Attitudes."

Measuring the vocational maturity construct

There have been only a few attempts to develop measures of vocational maturity. Nelson (1956) developed an operational definition of vocational maturity, which resembled Super's (1955) dimension of "Wisdom of Vocational Choice"; Super and his associates conducted extensive research on the measurement of vocational maturity as a part of the Career Pattern Study (Super, Crites, Hummel, Moser, Overstreet, and Warnath, 1957); Gribbons (1964) and Gribbons and Lohnes (1964 a; 1964 b) have developed measures of Readiness for Vocational Planning; and Crites (1965) has developed the Vocational Development Inventory. Each of these studies is described below to illustrate the various approaches that have been employed in measuring vocational maturity.

Nelson's vocational maturity index.--Nelson (1956) conducted a study to determine client satisfaction with counseling, and he collected data using an operational definition of vocational maturity which resembled Super's (1955) dimension of "wisdom of vocational choice."

Nelson's measure of vocational maturity consisted of the classification of an individual into a mature or immature category. The basis for the classification was to consider a client as being vocationally mature if any of his expressed interests, as elicited during the initial interview or on an information form, was "in harmony with his inventoried interests and tested aptitudes." An individual was classified as vocationally immature if he had no expressed interests, or if his expressed interests was incongruent with his inventoried interests or tested aptitudes. Nelson found that 61% of his clients were vocationally mature and 39% were vocationally immature.

Super's vocational maturity indices.--A great deal of research on the measurement of vocational maturity has been carried out in Super's Career Pattern Study, a 20-year longitudinal study of the vocational development of a sample of males between the ages of 15 and 35 (Super, Crites, Hummel, Moser, Overstreet, and Warnath, 1957). Super's indices of vocational maturity were based upon a wide variety of data. He used interview protocols, standardized tests, and classification schema. Twenty indices were constructed to assess the various hypothesized variables of vocational maturity (Super and Overstreet, 1960). The indices were logically and theoretically derived from developmental principles, previous studies, and counseling experience. Three developmental concepts were employed in constructing the indices: (1) development proceeds from random, undifferentiated activity to goal-directed, specific activity, (2) development is in the direction of increasing awareness and orientation to reality, and (3) development is from dependence to increasing independence.

The twenty indices were classified into five categories, as follows:

I. Orientation to Vocational Choice

   a. Concern with choice

   b. Use of resources in orientation

II. Information and Planning About the Preferred Occupation

   a. Specificity of information about the preferred occupation

   b. Specificity of planning for the preferred occupation

   c. Extent of planning activity

III. Consistency of Vocational Preferences

   a. Consistency of vocational preferences within fields

   b. Consistency of vocational preferences within levels

   c. Consistency of vocational preferences within families (fields and levels)

IV. Crystallization of Traits

   a. Degree of patterning of measured interests

   b. Interest maturity

   c. Liking for work

   d. Degree of patterning of work values

   e. Extent of discussion of rewards of work

   f. Acceptance of responsibility for choice and planning

   g. Vocational independence

V. Wisdom of Vocational Preferences

   a. Agreement between ability and preference

   b. Agreement between measured interests and preference

   c. Agreement between measured interests and fantasy preference

   d. Agreement between occupational level of measured interests and level of preference

   e. Socioeconomic accessibility of preference

The interviews of the ninth-grade boys had been conducted when the development of the vocational maturity indices was completed. Therefore, the principal method of measuring the indices was content analysis of typescripts of the recorded interviews. To test the hypothesis that the indices "should have some amount of positive interrelationship to be considered measures of vocational maturity," Super conducted correlational and factorial analyses of data collected on the 142 ninth-grade boys. The analysis of the results produced many nonsignificant and low negative correlations. However, the dimension "orientation to vocational choice," and "use of resources in orientation" were positively correlated with each other. Based upon these results and the results of the factor analysis, Super and Overstreet (1960, p. 75) concluded that only four of the twenty indices of vocational maturity possessed construct validity and that these "consist of one general factor, Planning Orientation, and three group factors which contribute differently to the four indices."

Gribbons' vocational maturity measure.--Gribbons (1964) has developed the Readiness for Vocational Planning (RVP) scales to assess vocational maturity. His method consists of a standardized interview which is similar to the indices of vocational maturity in the Career Pattern Study. As Super (1964) has observed, the RVP scales place more emphasis on aspects of self-knowledge than do the indices in the Career Pattern Study. Although a self-knowledge measure was not included in Super's indices of vocational maturity, his wisdom of vocational preferences measures can be considered indirect measures of self-knowledge. Self-knowledge was incorporated in Crites' model of the vocational maturity construct (Crites, 1965). The variables included in Gribbons' RVP are: Awareness of Factors to Consider in Making Curriculum Choices, Awareness

of factors to consider in making occupational choices, verbalized strengths and weaknesses, accuracy of self-appraisal, evidence for self-rating, awareness of interests and their relation to occupational choice, awareness of values and their relation to occupational choice, and independence of choice.

"Factors in curriculum choice" includes awareness of relevant factors, including one's abilities, interests, and values; their relation to curriculum choice, curricula available, courses within curricula; and the relation of curriculum choice to occupational choice.

"Factors in occupational choice" includes awareness of relevant factors, including abilities, interests, values; educational requirements for choice; relation of specific high school courses to choice; and accuracy of description of occupations.

"Verbalized strengths and weaknesses"includes the ability to verbalize appropriately the relation of personal strengths and weaknesses to educational and vocational choices.

"Accuracy of self-appraisal" includes comparisons of the pupil's estimates of his general scholastic ability, verbal ability, and quantitative ability with his actual attainments on scholastic aptitude tests, English grades, and mathematics grades.

"Evidence of self-rating" purports to measure the quality of the evidence cited by the pupil in defense of his appraisal of his own abilities.

"Interests" attempts to measure one's awareness of his interests and their relation to occupationsl choice.

"Values" attempts to measure one's awareness of his values and their relation to occupational choice.

"Independence of choice" attempts to measure the pupil's willingness to take personal responsibilities for his choices.

Gribbons collected RVP measures of 57 boys and 54 girls in the eighth grade and again in the tenth grade and demonstrated that there were significant increases with respect to the RVP variables studies. The RVP employs 41 questions in the interview schedule which are categorized under one of the eight dimensions described above. The questions in the interview were developed partly through modification of the questionnaires and scoring procedures used in the Career Pattern Study by Super. The author states that the questions are designed to stimulate the pupil to reveal his thinking process in making tentative educational and vocational choices, and to demonstrate his ability to analyze and synthesize information about himself and the world of work concerning these preferences.

It should be noted that the eighth-grade measures were taken before the student's participation in a group guidance course in which they used an experimental edition of <u>You: Today and Tomorrow</u>. It is not possible to determine in this study whether the same results would have been found if the pupils had not received the "treatments" unless one can assume that students in most schools are exposed to equivalent vocational guidance.

Since the investigator found that the mean RVP scores increased significantly from the eighth grade to the tenth grade and also that the scores were less variable in the tenth grade, it was suggested that such a finding was probably consistent with the contention of vocational psychologists that there should be a delay of one or more years in forced curriculum choice. However, this may not necessarily be the case for

all students. Many of the eighth-grade pupils scored above the tenth grade means, and many tenth graders scored below the eighth grade means, indicating that delay of curriculum choice may be unnecessary for some students. The implications of this research could be that we should not delay forced curriculum choice, but we should identify those with low RVP and give them some intensive guidance as early as the sixth grade, in much the same way that remedial reading is given to those who need it. The finding that vocational maturity (as defined by RVP) scores increased from the eighth to the tenth grade provides some evidence for the construct validity of vocational maturity as a developmental variable.

It should be pointed out that, although the pupils' vocational maturity scores, as a group, were significantly higher in the 10th grade than when those students were in the 8th grade, the correlations were relatively low (.36, .29, .22, .25, .23, .29) between 8th and 10th RVP, indicating a large number of shifts in rank from the first administration to the second.

A question is therefore raised: Should a valid developmental variable such as VM show <u>both</u> high correlations <u>and</u> increases in score to be considered a useful measure?

<u>Crites' vocational maturity measure</u>.--Crites (1965) has constructed the Vocational Development Inventory (VDI) to measure the behavior domain of choice competencies and attitudes which represent two of the four dimensions in his model of the construct of vocational maturity (See Figure 1).

An experimental form of the VDI Competence Test has been constructed by Crites and it is currently undergoing validation. In its first experimental form the Competence Test consists of five parts (one part for each

variable represented in the model, Figure 1). Each part consists of 30 multiple-choice items with from three to five distractors. Part I is the Problems Test, which is designed to measure the ability to resolve conflicts between the factors in vocational choice. Part II is the Planning Test, in which the task is to order scrambled series of steps leading to various vocational goals. Part III is the Occupational Information Test, which includes items on job duties and tasks, trends in occupations, and future employment opportunities. Part IV is the Self-Knowledge Test and is scored against standardized test information for accuracy of estimated vocational capabilities. Part V is the Goal Selection Test, the items of which require the examinee to choose the "best" (most realistic) occupation for a hypothetical individual who is described in terms of his aptitudes, interests, and personality characteristics. The functions or processes which are supposedly involved in taking the Competence Test, then, are largely what might be designated as they pertain to the vocational choice process. Crites is currently conducting a study (1965) of vocational development in which he is collecting data using the Competence Test and the Attitude Test of the VDI.

Crites developed the Attitude Test "to elicit the attitudinal and dispositional response tendencies in vocational maturity which may mediate both choice behaviors and choice aptitudes (1965)." The methodological approach which was used in the construction and standardization of the Attitude Test was based upon the principles of the rational (American Psychological Association, 1954) and empirical (Meehl, 1945) models for test development. Items were written which described various concepts of the vocational choice process, feelings about making career decisions, work values, etc.; and then the relationships of the items to age and grade,

as the criterion variables, were determined. If the items were related to age and grade, they were accepted for inclusion in the Attitude Test. Form III of the Attitude Test contains 60 true-false items and produces a total score to measure the Vocational Choice Attitude dimension included in the model for measuring vocational maturity (Crites, 1965). Although Crites' model includes five Vocational Choice Attitude variables, the instrument he constructed does not yield subtest scores for the separate variables. The Attitude Test is shown in the appendix.

Crites administered the Attitude Test to 3000 subjects and used two experimental forms which varied response format and item type (1965). On the basis of the data collected, the following conclusions were drawn:

1. Verbal vocational behaviors are related to both age and grade but more frequently to grade.

2. A true-false response format provides better item discrimination between grades than a Likert-type rating scale.

3. Items written in the first and third person singular produced essentially the same amount of item differentiation across age and grade levels.

4. The most notable trend in item response by age was predominantly true responses in the elementary school years to predominantly false responses in the high school years. (A question should be raised about the significance of such a finding since there is no theoretical basis for expecting maturity to consist of viewing statements as false.)

5. The average vocational maturity of the entire sample (5th-12th grades) was at approximately the eighth grade. There was an increase in vocational maturity at all grade levels except the eleventh grade, which was atypical.

6. The correlation of vocational maturity with age was .385 and with grade was .463.

The Vocational Choice Attitude Test theoretically measures five elements of the vocational choice attitudes dimension: (1) involvement, (2) orientation, (3) independence, (4) preference, and (5) conception. However, the instrument does not yield scores for each variable. Therefore, it is not possible to determine the extent to which the traits are correlated.

Validity of vocational maturity measures

The four vocational maturity measures which have been discussed vary considerably in the quality and type of external validity that has been collected by the author. Nelson (1956) did not use an external criterion to validate his vocational maturity "measure" while Super and Overstreet (1960), and Gribbons and Lohnes (1966) correlated their instruments with a number of external criteria. In this section of the proposal the findings concerning the relationship between vocational maturity and numerous external criterion variables will be discussed. Since the vocational maturity measures constructed by different investigators have not been demonstrated by any means to be measuring the same traits, correlations with the same criterion variables may not be comparable.

Mental ability and vocational maturity.--There is not common agreement among investigators regarding the hypothesized relationship between mental ability and vocational maturity. Super and Overstreet

hypothesize a positive relationship on the basis that more capable individuals should be more effective in dealing with the developmental tasks in many areas of behavior, including the vocational area (Super and Overstreet, 1960, p. 78). They cite earlier studies by Grace (1931), Sparling (1933), and Wrenn (1935) which indicated that there was a positive relationship between intelligence and appropriate vocational goals. In addition, they (Super and Overstreet) cite their finding that vocational maturity and intelligence of boys in the Career Pattern Study correlated significantly, although the correlation of .29 indicates that less than 9% of the elements in intelligence are shared with the elements in vocational maturity.

Gribbons and Lohnes (1966), apparently hypothesizing a low relationship between their vocational maturity scales and intelligence, were pleased to report that the correlations obtained from the initial administration (1958) of their Readiness for Vocational Planning scales were below .30, except for the Evidence for Self-Rating scale which correlated .50. The multiple correlation between 8th grade RVP and intelligence was .57, significant at the .001 level. They found nonsignificant correlations between these variables two and a half years later when their subjects were completing the tenth grade.

Socioeconomic status and vocational maturity.--Although the relationship between vocational maturity and socioeconomic status is not at all well established, a positive relationship would be expected if one accepts the proposition that a favorable socioeconomic environment should encourage more planful types of behavior (Ginzburg, 1951; Reynolds and Shister, 1949). In the Career Pattern Study, Super and Overstreet (1960) found a significant correlation of .27 between vocational maturity total scores and parental occupational level.

Gribbons and Lohnes (1966) found a significant but low multiple correlation (.14) between eighth grade Readiness for Vocational Planning Scales and parental occupational level when their subjects were in the tenth grade; no relationship was found when their subjects were in the eighth grade.

Level of occupational aspiration and vocational maturity.--Since occupational aspiration level may reflect one's achievement drive, it would be expected that "the greater the individual's need to achieve, the earlier he will begin to deal with the task of making vocational choices if his achievement needs are channeled into vocational areas" (Super and Overstreet, 1960, p. 84). Data collected in the Career Pattern Study showed that vocational aspiration level and vocational maturity total score correlated .32, significant beyond the .01 level (Super and Overstreet, 1960, p. 110).

Gribbons and Lohnes (1966) correlated 8th grade RVP scales with Roe level of occupational preferences and found that five of the eight scales were significantly correlated; the significant scales were: factors to consider in curriculum choice, factors to consider in occupational choice, evidence for self-rating, interests, and values. The significantly correlated scales between 8th grade RVP and Roe level of occupational preference in the 10th grade were factors to consider in curriculum choice, verbalized strengths and weaknesses, accuracy of self appraisal, and interests. All 8th grade RVP scales were significantly correlated with Roe level of occupational preference in the 12th grade. It should be noted that scale I, factors to be considered in making curriculum choices, and scale II, interests, predicted Roe level of occupational preference in the 8th, 10th, and 12th grades.

Gribbons and Lohnes (1966) found a similar pattern using Hamburger revision of Warner's scale, the main exception being that values and factors in occupational choice did not discriminate occupational level.

General psychological adjustment and vocational maturity.--On the assumption "that individuals who are better adjusted are freer to deal with developmental tasks than are less well-adjusted individuals," Super and Overstreet (1960, p. 111) correlated vocational maturity with the Thematic Apperception Test and Rotter's Incomplete Sentences Blank. Vocational maturity was not related to either of these two measures; the correlations were near zero.

Vocational adjustment and vocational maturity.--Vocational maturity is a construct which theoretically accounts for differences found among pupils in their later vocational adjustment. Pupils who exhibit high levels of vocational maturity presumably will make better vocational adjustments than pupils with low vocational maturity scores. Gribbons and Lohnes found that their Readiness for Vocational Planning scales administered in the 8th grade were able to predict vocational adjustment seven years later when their subjects were two years out of high school. (Gribbons and Lohnes, 1966, p. 98.) The criterion, "adjustment," was collected in individual interviews and subjects were rated successful "if they are maintaining, refining or enhancing their career objectives; they would be rated as unsuccessful if their current employment obviously and seriously contradicts their current aspirations; and they would be rated as neutral if they are currently engaged in the roles of housewife or serviceman, on the grounds that it is premature to judge the actual meanings of these roles for career phenomenology." (Gribbons and Lohnes, 1966, p. 98.) The authors point out that although the above criterion of vocational adjustment is a subjective one, the interrater agreement between the two (Gribbons and Lohnes)

was perfect, as was demonstrated by the fact that "they are able to agree on the proper score assignment for every subject with no difficulty," . . . (Gribbons and Lohnes, 1966, p. 98).

Developmental variable criterion.--Gribbons and Lohnes (1966, p. 36) compared the RVP scores of pupils at the beginning of the 8th grade with their RVP scores at the end of the 10th grade. Fisher's correlated "t" test was used to demonstrate that significant (.001) increases were made on all RVP scales, providing evidence that the RVP scales were measuring developmental variables.

Crites, in constructing the Vocational Development Inventory, demonstrated that his instruments contained verbal vocational behaviors that are "monotonically related to both age and grade; but are more frequently associated with the latter than the former." (Crites, 1965, p.32.)

Stability of vocational maturity.--Evidence of stability of vocational maturity comes from Gribbons and Lohnes whose data showed that, although there was a shift towards greater maturity, the individual profiles were relatively stable. The canonical correlations between 8th and 10th RVP indicated that a total overlap in variances of 57% had been established between the two sets of scores. This finding reflects a significant amount of stability in the RVP trait measurements.

Dimensions of vocational maturity.--The question of the multidimensionality of vocational maturity has been examined by Super and Overstreet (1960), and Gribbons and Lohnes (1965) using factor analytic methods.

Super and Overstreet (1960) factor analyzed six "adequate" indices (Concern with Choice, Acceptance of Responsibility for Choice and Planning, Specificity of Information About the Preferred Occupation, Specificity of Planning for the Preferred Occupation, Extent of Planning Activity, and

Use of Resources in Orientation and Independence of Work Experience. Five factors accounted for 38 percent of the variance. The five factors identified were Planning (I), Independence of Work Experience (II), The Long View Ahead (III), The Short View Ahead (IV), and The Intermediate View (V).

Gribbons and Lohnes (1966) factor analyzed eight Readiness for Vocational Planning scales administered in the 8th grade and found positive loadings in all eight scales, suggesting the presence of a general vocational maturity factor. The second factor was dominated by Accuracy of Self Appraisal. The third factor was dominated by a high negative loading on Evidence of Self Rating.

Vocational maturity and curriculum enrollment.--Gribbons and Lohnes (1966) examined the RVP of pupils enrolled in different curricula: College, Business, and General-Industrial Arts. The discriminant analysis indicated that the ability to estimate accurately one's scholastic abilities and to cite the rationale for these estimates appear to distinguish those students in the college preparatory group which had higher RVP scores.

Need for further study

While there has been previous research in the area of vocational maturity, there are aspects of the problem which make further research desirable.

First, an objective measure of the dimensions of vocational maturity is not currently available for the working counselor. Crites' Vocational Development Inventory-Attitudes Test seeks to measure only one of the four dimensions of vocational maturity; his Vocational Development

Inventory-Competence Test is currently being developed but has not been validated. Both Gribbons' Readiness for Vocational Planning and Super and Overstreets' measures of vocational maturity involve interview procedures which are very time consuming.

Second, the entire construct of vocational maturity needs further study and validation to determine empirically the various dimensions of the construct. Crites has provided a model of the construct of vocational maturity based upon the vocational maturity indices developed by Super. This model can be used to test various hypotheses concerning the internal structure of the vocational maturity domain. Further study may reveal whether the vocational maturity domain is multidimensional and whether the variables group themselves in the hypothesized manner.

Third, the theoretical proposition that the variables of vocational maturity group themselves into four dimensions, as hypothesized by Crites, has not been substantiated. In order to examine this theory empirically, separate subtests must be developed for each variable.

Fourth, the relationship between vocational maturity and other criteria needs to be examined further in order to increase our understanding of vocational maturity. Data are needed to determine the degree to which vocational maturity is related to such variables as job satisfaction and career patterns.

Rationale of the Project

The basic rationale in this project is that a theoretically sound, objective measure of vocational maturity can be used to increase our understanding of the construct of vocational maturity, to identify pupils who need special assistance in the area of vocational development, and to

evaluate programs designed to provide students with vocational exploratory experiences. The instrument to be developed in this project will not only be based upon a theoretical model of vocational maturity but it also will provide information which may shed evidence on the validity of the theoretical framework on which the instrument is based.

The theoretical framework described in the Review of Related Literature section of this proposal specifies various indices and dimensions which purportedly represent the domain of vocational maturity. The value of the theory rests upon its capacity to generate various hypotheses which can be tested empirically. The theoretical model of the construct of vocational maturity can be examined by studying the relationships of variables for which theoretically and empirically valid measures have been constructed. The results of the analysis of data based on the theoretical model can be used as a basis for verifying or revising the model and may pave the way for a reformulation of the construct of vocational maturity.

The practical implications of a vocational maturity instrument deal with its potential use in identifying pupils whose vocational maturity level is insufficient for executing the various decision-making processes which the students need for vocational development. Vocational educators need more information about how to help students learn to make appropriate career decisions based upon a realistic assessment of their unique capabilities and interests, and upon a clear understanding of employment opportunities and requirements. However, students who are in greatest need of this kind of help must be identified before it is possible to know which individuals are to receive the appropriate treatment. Haphazard, subjective, and unreliable methods of identifying a pupil's level

of vocational development must be replaced with objective, reliable, and valid measures of vocational maturity. Efforts must be made to remove vocational maturity assessment from the realm of folklore and place it on a scientific basis. The proposed project seeks to take a small step in the direction of improving methods for the objective measurement of a construct presumed to be an important factor in the future vocational attainment of pupils.

Recently Gribbons and Lohnes (1966, p. 98) collected data which showed that less than half of the pupils in their sample were making successful vocational adjustments. Probably the most significant aspect about this finding was that the individuals who were classified as unsuccessful could be identified at the eighth grade, seven years before the vocational adjustment criteria were collected. Obviously, an objective measure of vocational maturity is needed so that potential vocational maladjustments can be prevented by identifying pupils with low vocational maturity scores and providing them with appropriate exploratory experiences.

Objectives of the Project

The general objective of this project is to construct, tryout, and hopefully validate a reliable and valid objective measure of vocational maturity, based upon the constructs developed by Super and his associates in the Career Pattern Study and organized by Crites (1961) into a model of vocational maturity.

THE METHOD

The Population and Samples

This research project is concerned primarily with measuring the vocational maturity of public school pupils enrolled in grades 8-12 in the southern states. Probability samples of pupils from this population will be drawn so that the instrument developed in this project can be used to measure the vocational maturity of public school pupils in any of the southern states. The sampling plan for this project will be designed to take into account both rural and urban schools, Caucasian and Negro schools, and other factors which might account for variability in levels of vocational maturity. The sampling plan will specify that three samples will be drawn from the population of public school pupils in grades 8-12 in the southern states. One sample will be administered the Tryout Form of the Vocational Maturity Measure; another sample will be administered the Preliminary Form of the Vocational Maturity Measure; a third sample will be administered the Final Form of the Vocational Maturity Measure.

The administration of the Tryout Form of the Vocational Maturity Measure will provide data needed to select items which meet two criteria established for the selection of valid vocational maturity items. The developmental variable criterion requires that the mean item scores increase across grade levels; the homogeneous grouping criterion requires that items included in the same subtest show greater intercorrelations than the intercorrelations of items in different subtests.

The Preliminary Form of the Vocational Maturity Measure will be administered to a second sample (cross-validation), drawn in the same

manner as the original Tryout Sample, to increase confidence in the significance of the differences between age levels and to insure that the differences are not due to chance fluctuation in the sampling. Reliability estimates and criterion related validity coefficients will also be calculated on this sample so that the Vocational Maturity Measure can be revised before it is administered to the Preliminary Sample.

The Final Form of the Vocational Maturity Measure will be administered to a third sample to provide normative data for the instrument. The data collected in the final administration will be used to establish percentiles, reliability estimates, and criterion related validity coefficients which will be reported in the Technical Manual to accompany the Vocational Maturity Measure.

Design of the Project

The conduct of this project requires the completion of eight phases. These phases and their activities are shown on the PERT Network in Appendix A and are listed below:

Phase I. Proposal Development

Activity Number	Activity
0-1	Write proposal introduction
1-2	Write proposal methodology
2-3	Review of proposal

Phase II. Analysis of Existing Measures of Vocational Maturity

Activity Number	Activity
3-4	Analyze Super's scales
3-5	Analyze Crites' scales
3-6	Analyze Gribbons' scales

Phase III. Delineation of Vocational Maturity Variables

Activity Number	Activity
7-8	Define VM variables

Phase IV. Development of Tryout Form

Activity Number	Activity
9-13	Develop sampling plan
10-14	Select item writers
11-15	Questionnaire outline
12-16	Identify criterion variables
14-17	Draft items
17-18	Review items
18-19	Revise items
19-20	Assemble tryout form
13-21	Select tryout sample
21-28	Select test administrators
22-28	Student directions
23-28	Scoring procedures
24-28	Answer sheets
25-28	Administrator directions
15-26	Draft questionnaire
16-27	Select criterion measures

Phase V. Development of Preliminary Form

Activity Number	Activity
28-29	Tryout administration
13-33	Select preliminary sample (cross validation)
29-32	Score instruments
26-30	Review questionnaire
27-31	Obtain criterion instruments
32-34	Item analysis
30-35	Questionnaire approval
31-36	Prepare administration schedule
34-37	Item selection
37-38	Assemble preliminary form
38-39	Revise directions
33-39	Select test administrators
35-39	Mimeograph questionnaire
36-39	Package criterion instruments

Phase VI. Development of Final Form

Activity Number	Activity
40-43	Administer preliminary form
41-43	Administer criterion instruments
42-43	Administer questionnaire
43-45	Score preliminary form
44-47	Item analysis
45-48	Reliability estimate
46-49	Validity coefficient
50-51	Item selection
13-52	Select standardization sample
52-55	Select test administrators
51-53	Assemble final form
53-54	Revise questionnaire
54-55	Revise directions

Phase VII. Standardization of Final Form

Activity Number	Activity
56-59	Administer final form
57-59	Administer questionnaire
58-59	Administer criterion instruments
59-60	Score final form
61-65	Item analysis
62-65	Reliability estimate
63-65	Validity coefficient
64-66	Technical manual outline
67-68	Prepare technical manual

Phase VIII. Preparation of Research Report

Activity Number	Activity
68-69	Prepare preliminary draft of report
69-70	Mimeograph preliminary report
70-71	Formal technical review
71-72	Revise preliminary draft
72-73	Prepare final report
73-74	Duplicate final report

The first phase is the proposal development phase which involves writing the introduction and methodology sections and having the proposal reviewed and evaluated. Event 3 on the PERT Network represents the completion of the last activity in Phase I.

The second phase involves carrying out a critical analysis of three existing measures of vocational maturity to determine what implications they have for constructing a new measure of vocational maturity. Although they were explored in a very general way in the review of the literature section, they include a great deal of technical material which takes more time to fully analyze. Phase II is completed before Event 7 occurs.

The third phase is described as a delineation of vocational maturity variables and involves developing operational definitions of variables in terms of student behaviors. Event 8 brings to a close Phase III.

The fourth phase is the development of a Tryout Form (sometimes referred to as the form for pretesting). The Tryout Form is the first VM form and is developed on a logical and theoretical basis; it is the best form to develop before the instrument is actually administered and item analyses conducted. This Tryout Form is developed by drafting items which conform to the VM definitions which have been set forth in Phase III. Then, the items are submitted to specialists in the area for their review and appraisal. The items will be revised subsequently. Event 28 represents completion of the Tryout Form.

The fifth phase is to develop the Preliminary Form. It begins with the administration of the Tryout Form and ends with Event 39. This phase is very important because here item analyses and item selection which must meet at least two criterion must be conducted. One criteria is referred to as a developmental variable criterion and specifies that valid VM items should show increased mean scores across grade levels; in other words, a developmental variable such as vocational maturity should increase with

age and grade. A second criterion which will be applied is a statistical grouping criterion. Item intercorrelations will be computed and then examined to determine which items belong together in a statistical sense. The reason for this is that grouping items only in terms of some theory rarely produces instruments that have desirable properties as measuring devices; too often the scales produced are too highly correlated with one another, which means they measure characteristics which overlap. This is an important consideration with our VM measure because the model proposed by Crites specifies 18 traits which are grouped into 4 dimensions. Event 39 ends the fifth phase.

The sixth phase of the project is the development of the Final Form. By administering the Preliminary Form to a second sample of pupils in grades 8-12, we can obtain item analysis data to cross-validate the items selected in the previous phase. We will also have completed a questionnaire to collect additional data about the student (his parents, etc.) and we will have criterion measures and reliability estimates. One might stop at this point except for the fact that revisions may be in order. For example, reliability estimates may be too low and additional items may be needed to raise the reliability. Event 51 ends the sixth phase.

The seventh phase of the project is to standardize the Final Form. This involves the final administration of the instrument and the collection of normative data as well as reliability and validity data which will be reported in a technical manual for potential users of the instrument. Event 59 completes Phase seven.

The eighth phase is the preparation of the research report and the activities are those specified by the Research Management and Resource Allocation System of the Center.

Data and Instrumentation

The data collected in this project will be obtained from the administration of the Vocational Maturity Measure and the criterion-related validity measures. Since the major goal of this project is to develop the Vocational Maturity Measure, the rationale and procedures for developing the vocational maturity instrument are discussed in considerable detail.

Vocational Maturity Measure

Items developed for measuring vocational maturity must be grouped together in the specified categories in such a way that they form a meaningful measuring instrument. Under ideal conditions the items should all belong together in a statistical sense, and in this sense items grouped together in the same category should all measure a common variable. Items may be grouped together in the same category on the basis of judgment either because they appear to belong together or because there is some theoretical basis for grouping them together. However, this method of grouping items has the disadvantage of including items which are sometimes empirically invalid for the construct they are supposed to measure (American Psychological Association, 1954). Therefore, methods of grouping that depend upon the interrelationships of the items should also be employed so that the items will group together both theoretically and empirically. The methods used in this project will be designed to insure that the items which constitute the vocational maturity instrument will be grouped together theoretically and statistically.

Delineation of Vocational Maturity Variables.--The categories for the vocational maturity measure will be established by the adoption of

Crites' model of the construct of vocational maturity (Crites, 1965, p.5). The model specifies eighteen indices (variables) grouped under four dimensions, and theoretically constitutes the vocational maturity domain. The pictorial model appears in the related research section (Figure 1) of this proposal. The four dimensions and eighteen variables are as follows:

	DIMENSION	VARIABLE
1.	Consistency of Vocational Choice	Time
2.	Consistency of Vocational Choice	Field
3.	Consistency of Vocational Choice	Family
4.	Consistency of Vocational Choice	Level
5.	Wisdom of Vocational Choice	Abilities
6.	Wisdom of Vocational Choice	Activities
7.	Wisdom of Vocational Choice	Interests
8.	Wisdom of Vocational Choice	Social Class
9.	Vocational Choice Competencies	Problem Solving
10.	Vocational Choice Competencies	Planning
11.	Vocational Choice Competencies	Occupational Information
12.	Vocational Choice Competencies	Self-Knowledge
13.	Vocational Choice Competencies	Goal Selection
14.	Vocational Choice Attitudes	Involvement
15.	Vocational Choice Attitudes	Orientation
16.	Vocational Choice Attitudes	Independence
17.	Vocational Choice Attitudes	Preference
18.	Vocational Choice Attitudes	Conception

Crites' model implies that the domain of vocational maturity consists of four dimensions, or group factors, each of which includes four or five variables. The model also suggests hypotheses which can be tested by examining empirically the internal structure of a vocational maturity measure which is based upon the model.

Inasmuch as Crites' model of vocational maturity represents an organization of the constructs used in the Career Pattern Study, there is a possibility that the recent factor analytic work of Martha Heyde and Jean Jordaan in connection with the Career Pattern Study measures may shed further light on the model of vocational maturity. Consequently,

the investigators will draw upon these recent factor analytic studies as well as upon Crites' model of vocational maturity.

One of the major tasks in this project will be to define and delimit the eighteen variables, or categories, of vocational maturity so that items can be written for each. The procedure to be followed in accomplishing this task will be patterned after the model suggested by Flanagan (1951). Flanagan's procedure involves three steps: (1) describe the behaviors to be measured, (2) analyze the behaviors to be measured, and (3) formulate item specifications to measure the behaviors. The sources used to develop the definitions will be various statements of vocational development theory (Ginzberg, et.al., 1951; Super, 1957) and the scoring manuals used in the Career Pattern Study (Super and Overstreet, 1960, p. 159). Twenty indices of vocational maturity were included in Super and Overstreet's study of ninth-grade boys; each index was defined operationally by the scoring manuals which provide illustrative responses for each index, as well as the weights which might be assigned to each response. Consequently, it is possible to use the scoring manuals as a basis for constructing objective items to measure vocational maturity (Super, 1967). The following indices were used in Super and Overstreet's Career Pattern Study:

1.	Index I.	A	Concern with choice
2.	Index I.	B	Use of resources in orientation
3.	Index II.	A	Specificity of information about the preferred occupation
4.	Index II.	B	Specificity of planning for the preferred occupation
5.	Index II.	C	The extent of planning activity

6.	Index	III. A	Consistency of vocational preference within fields
7.	Index	III. B	Consistency of vocational preferences within levels
8.	Index	III. C	Consistency of vocational preferences within families
9.	Index	IV. A	Degree of patterning of measured interests
10.	Index	IV. B	Interest maturity
11.	Index	IV. C	Liking for work
12.	Index	IV. D	Degree of patterning of work values
13.	Index	IV. E	Extent of discussion about rewards of work
14.	Index	IV. F	Acceptance of responsibility for choice and planning
15.	Index	V. A	Independence of work experience
16.	Index	VI. A	Agreement between ability and preference
17.	Index	VI. B	Agreement between measured interests and preferences
18.	Index	VI. C	Agreement between measured interests and fantasy preference
19.	Index	VI. D	Agreement between occupational level of measured interests and level of preference
20.	Index	VI. E	Socioeconomic accessibility of preference

Development of Tryout Form.--After the variables have been defined behaviorally, approximately forty items will be written for each. The items will be written to conform to the formulated definitions of each variable and will constitute the first draft of the items with subtests as shown on the following page.

VOCATIONAL MATURITY ITEMS

VARIABLE	SUBTEST	DIMENSION
Consistency of Vocational Choice		
1. Time	40	160
2. Field	40	
3. Level	40	
4. Family	40	
Wisdom of Vocational Choice		
5. Abilities	40	160
6. Activities	40	
7. Interests	40	
8. Social Class	40	
Vocational Choice Competencies		
9. Problem Solving	40	200
10. Planning	40	
11. Self-knowledge	40	
12. Occupational Information	40	
13. Goal Selection		
Vocational Choice Attitudes		
14. Involvement	40	200
15. Orientation	40	
16. Independence	40	
17. Preference	40	
18. Conception	40	
TOTAL ITEMS		720

The first draft of the vocational maturity items will be submitted to authorities in the area of vocatinal choice and development for their review and evaluation. The authorities will be asked to examine the items for the purpose of determining whether the items are logically and theoretically valid measures of the defined variables. The authorities will be asked to indicate: (1) those items which appear to be adequate, (2) those

items which are irrelevant to the measurement of the particular variable, (3) those items which need revisions, and (4) suggestions for revising the items. The information obtained from the authorities will be used to revise, to improve, and to eliminate items in the first draft of the instrument.

After the first draft has been evaluated by persons knowledgeable in the field of vocational development, some items will be revised, some items will be eliminated, and some items may be added to the original list. It is expected that the evaluation process will result in a reduction of the number of items retained for each subtest. An effort will be made to retain approximately thirty items for each subtest for inclusion in the Tryout Form of the instrument.

The revisions of the first draft of items will produce a Tryout Form of the vocational maturity instrument which will consist of eighteen subtests, each of which will contain approximately thirty items. It will be possible to derive a score for each variable. Thus, one score will indicate the relative consistency of a person's occupational choice, another the degree of vocational choice problem solving competency that the pupil possesses, another the pupil's involvement in vocational choice. Thus, the total number of items can be made to yield eighteen subtest scores.

In addition to subtest scores, it will also be possible to derive a dimension score for each of the four dimensions. The Tryout Form of the vocational maturity instrument will contain the subtests shown on the following page. The number of items is shown in the parentheses.

VOCATIONAL MATURITY MEASURE
Tryout Form)

	Subtest Score	Dimension Score
1. Time (30)		
2. Field (30)		
3. Level (30)		
4. Family (30)		
Consistency of Vocational Choice Score		
5. Abilities (30)		
6. Activities (30)		
7. Interests (30)		
8. Social Class (30)		
Wisdom of Vocational Choice Score		
9. Problem Solving (30)		
10. Planning (30)		
11. Occupational Information (30)		
12. Self-Knowledge (30)		
13. Goal Selection (30)		
Vocational Choice Competency Score		
14. Involvement (30)		
15. Orientation (30)		
16. Independence (30)		
17. Preference (30)		
18. Conception (30)		
Vocational Choice Attitudes Score		
Total Vocational Maturity Score		

The Tryout Form of the Vocational Maturity Measure will contain items which have been grouped into subtests and dimensions on a logical and theoretical basis. The advantage of this procedure for grouping items is that it produces a set of measurements which are closely related to the theory on which the instrument is based and that the measures may be independent of each other in a theoretical sense. Although this method of grouping is an attractive one in some respects, it has its limitations in an area such as vocational maturity where not too much is known about how the items of information should be grouped together. Grouping items only in terms of some theory rarely produces instruments that have particularly desirable properties as measuring devices. Too often the scales thus produced are too highly correlated with one another, which means that they measure characteristics which overlap. Therefore, additional procedures must be used to insure that the items belong together in a statistical sense, and considerable further work must be performed with these scales to refine them to the point where they are actually useful. Thus, the need for an empirical examination of the grouping of items is apparent. The administration of the Tryout Form will provide the data necessary for evaluating empirically the grouping of the items.

Development of Preliminary Form.--The Tryout Form of the Vocational Maturity Measure will be administered to pupils at each grade level in grades eight through twelve in the schools which have been identified in the sampling plan. The administration of the vocational maturity measure to this sample will provide data needed to evaluate both the grouping of the items within the various subtests and the inclusion of items which meet the criterion of a developmental variable.

The data collected from the administration of the Tryout Form of the vocational maturity instrument will be used to carry out an empirical evaluation of the items which have been constructed on a logical and a theoretical basis. Both a developmental variable criterion and an empirical grouping criterion will be applied in the evaluation of items to be retained in the Preliminary Form of the instrument.

To insure that the items retained meet the criterion of a developmental variable, items which do not show increases in the proportion passing at each grade will be eliminated. This criterion is applied to satisfy the requirement that a developmental variable, such as vocational maturity, must produce scores that are related to age, because unless they correlate with age, there is no evidence that the behaviors mature over time (Crites, 1961, p. 257). The application of this procedure to each of the items will produce an instrument with variable and dimension scores which increase across grade levels. The actual number of items retained as a result of this analysis cannot be predicted precisely, although it is anticipated that the number of items for each variable will be reduced from thirty to approximately twenty-five.

The next step will be to carry out analyses to verify the empirical grouping of the items. The empirical grouping of the items will be validated by computing item-subtest correlations (biserial correlations). The biserial correlations will provide data needed for eliminating items which are not highly correlated with the subtest under which they have been grouped logically. The number of items for each variable will be reduced from twenty-five to approximately twenty.

The completion of the empirical item analyses of the Tryout Form will produce items which (1) group together logically and theoretically,

(2) increase in the proportion passing across grade levels, and (3) group together in a statistical sense. These items will constitute the Preliminary Form. It should be emphasized that the quality of the original items will determine how many items must be eliminated; hence, the actual number of items retained could vary considerably.

Development of Final Form.--The Final Form of the Vocational Maturity Measure will be developed by analyzing the data collected from the administration of the Preliminary Form of the Vocational Maturity Measure to a second sample of pupils in grades eight through twelve. The data collected from the administration of the Preliminary Form of the Vocational Maturity Measure will provide the necessary data for (1) cross validating the items,(2) determining reliability estimates, and (3) establishing validity coefficients.

Item analyses will involve calculating p values and item intercorrelations similar to the analysis performed in developing the Preliminary Form; the purpose of this analysis is to increase confidence in the significance of the differences between age levels and to insure that the differences are not due to chance fluctuations in the sampling.

Reliability estimates will be determined for the Preliminary Form so that needed revisions can be made before the administration of the instrument to the standardization sample. Validity coefficients will also be established on the Preliminary Form.

The Final Form of the Vocational Maturity Measure will incorporate any changes or revisions suggested by the item analyses, reliability estimates, and validity coefficients which will be obtained from the administration of the Preliminary Form.

Standardization of Final Form.--The Final Form of the Vocational Maturity Measure will be administered to a third sample of pupils in grades 8-12 to provide normative data on the instrument. The normative data will be included in the Technical Manual and will consist of item statistics, reliability coefficients, and validity information. The administration of the Final Form of the Vocational Maturity Measure, the analysis of the data, and the preparation of the Technical Manual will constitute the last phase of the instrument development activities of the project.

Analysis of the Data

Several different statistical analyses will be employed in the conduct of this project. The first statistical analyses will be on the data collected from the administration of the Tryout Form of the Vocational Maturity Measure. For each item on the Vocational Maturity Measure, p values (proportion of subjects passing) will be calculated for each grade level, 8-12. Items which consistently show increases in p values across grade levels will be retained for the next stage of analysis. The purpose of this analysis is to select vocational maturity items which meet the criterion of a developmental variable. The criterion of a developmental variable such as vocational maturity requires that the items show an increase across grade levels in the proportion of subjects passing a given item.

A second analysis will be carried out on the data collected from the administration of the Tryout Form of the Vocational Maturity Measure to determine whether items which have been grouped together actually belong together in a statistical sense. The appropriate analyses for attaining this objective is the negative item analysis technique proposed by

Guilford (1954, p. 442). Basically, this analysis involves calculating item intercorrelations and identifying those items which show higher correlations with its subtest scores than with other subtest scores.

Various statistical analyses will be performed with the data collected from the administration of the Preliminary Form of the Vocational Maturity Measure. In addition to examining the p values and intercorrelations of the vocational maturity items, reliability and validity estimates will be determined. The internal consistency (homogeneity) of the subtests will be examined using split-half and Kuder-Richardson procedures. Coefficients of stability will be determined using both a two-week and a one-year interval. If equivalent forms of the instrument are constructed, coefficients of stability, and coefficients of stability and equivalence will be obtained for each subtest and for the total test. The statistical analyses performed on the data collected from the administration of the Preliminary Form will provide a basis for making appropriate revisions before the instrument is administered to the standardization sample.

The data collected from the administration of the Vocational Maturity Measure to the standardization sample will be analyzed to provide normative data which will be included in the Technical Manual. The analyses will include standard validity coefficients, discriminant function analysis, multivariate analysis of variance, as well as reliability coefficients.

Expected End-Product

The expected end product of this research is a report which will give an account of the project and will include the Vocational Maturity Measure, an Administrator's Manual, and a Technical Manual which will provide normative data for the Vocational Maturity Measure.

Time Schedule

The time schedule for the Vocational Maturity Project was determined by an analysis of the project activities and by an analysis of the time needed to complete each activity. The time schedule shown below is based upon the PERT Network which appears in the Appendix.

1.	Start Project	March 1, 1967
2.	Complete Introduction	April 26, 1967
3.	Complete Method	June 21, 1967
	Complete Proposal Review and Evaluation	August 16, 1967
	Complete Analyses of Existing Measures of VM	November 16,1967
	Complete Delineation of Vocational Maturity Variables	December 18, 1967
	Complete Development of Tryout Form	September 11, 1968
	Complete Development of Preliminary Form	January 31, 1969
	Complete Development of Final Form	August 29, 1969
4.	Complete Data Collection (Final Form)	October 31, 1969
5.	Complete Analysis of Data on Final Form	January 13, 1970
6.	Complete Draft of Research Report	March 10, 1970
7.	Complete Mimeographing of Preliminary Draft of Research Report	March 24, 1970
8.	Complete Formal Technical Review and Revision of Preliminary Draft of Research Report	May 26, 1970
9.	Complete Preparation of Final Research Report	June 9, 1970
10.	Complete Duplication of Final Research Report	June 23, 1970

Personnel

Dr. Bert W. Westbrook will serve as principal investigator and will devote full time to the project. Dr. Joe R. Clary will serve as associate investigator; a portion of his responsibility with the RCU is being devoted to the development and conduct of this project.

Dr. Westbrook is Research Assistant Professor of Education and Psychology at North Carolina State University. He holds the A.B. degree from High Point College and the Ed.D. degree from Florida State University, where he majored in Educational Research and Testing, and minored in Guidance and Counseling. His experience ranges from the prediction of success in graduate school to the development and validation of instruments intended to measure cognitive processes. He is author or co-author of articles in educational and psychological journals, including The High School Journal, Journal of Educational Research, and Educational and Psychological Measurement.

Dr. Clary is Assistant Professor of Education and Director of the Research Coordinating Unit at North Carolina State University. He holds the B.S. degree from North Carolina State University and the Ph.D. from Ohio State University. He is the author of articles in the American Vocational Journal and the Agriculture Education Magazine, and he teaches courses in Occupational Education, and Principles and Practices of Introduction to Vocations. He is also co-author of the Introduction to Vocations Teacher's Guide which has been published by Chronicle Guidance, Inc.

Dr. John K. Coster, Director of the Center for Occupational Education, will serve as the principal consultant on the design of the project.

Other North Carolina State University faculty will be asked to be available for consultation on the project.

Dr. Donald E. Super, Professor of Psychology and Education, Teachers College, Columbia University, has agreed to serve as a consultant to the Vocational Maturity Project. Dr. Super received the bachelor of arts and master of arts degrees from Oxford University. He received his Ph.D. from Columbia University. Dr. Super has served as president of APGA, president of Division 17 of APA, and vice president of the World's Vocational Guidance Association. Dr. Super is a frequent publisher of articles in the Journal of Counseling Psychology and the Personnel and Guidance Journal; he is author of The Psychology of Careers and Appraising Vocational Fitness by Means of Psychological Tests. Dr. Super directed the Career Pattern Study, a twenty-year longitudinal study of the vocational development of a sample of males between the ages of 15 and 35; he has published two monographs in connection with the Career Pattern Study and he is in the process of publishing two additional monographs in this series.

Two graduate assistants will be employed for this project. Mr. Robert C. Evans, Jr., will assist in item writing, test scoring, and statistical analysis of the data. Mrs. Renitta Coldman will assist in item writing, data processing, and test scoring.

Facilities

The facilities and services at North Carolina State University and throughout the state are well-suited for the conduct of the proposed project, and include the following: the cooperation of the State Department of Public Instruction with respect to making arrangements

to collect data from selected school systems; the use of State Department of Public Instruction's IBM 1230 Test Scoring machine which can score large numbers of answer sheets and simultaneously punch the responses on data cards; the University Computing Center with its IBM 360 system for data processing and extensive library of programs for all the major analyses of the project; the Research Coordinating Unit which will make it possible to keep up to date on the literature in vocational maturity research and related topics; and the Center for Research in Occupational Education which provides facilities and support for research in occupational education.

REFERENCES

American Psychological Association. 1954. Technical recommendations for psychological tests and diagnostic techniques. Psychological Bulletin, (Supp.), Part 2, 2:51.

American Psychological Association, American Educational Research Association, National Council on Measurement in Education. 1966. J. W. French and W. B. Michael (Co-Chm.), Standards for Educational and Psychological Tests and Manuals. American Psychological Association, Inc., Washington, D. C.

Bell, H. M. 1938. Youth Tell Their Story. American Council on Education, Washington, D. C.

Crites, J. O. 1961. A model for the measurement of vocational maturity. Journal of Counseling Psychology, 8:255-259.

Crites, J. O. 1965. The measurement of vocational maturity in adolescence: I, The Attitude Test of the Vocational Development Inventory. Psychological Monographs, 79:1-36.

Dysinger, W. S. 1950. Maturation and vocational guidance. Occupations, 29:198-201.

Flanagan, J. C. 1951. The use of comprehensive rationales in test development. Educational and Psychological Measurement, 11:151-155.

Ginzberg, E., Ginsburg, S. W., Axelrod, S., and Herma, J. L. 1951. Occupational Choice. Columbia University Press, New York.

Grace, A. G. 1931. The relationship of mental ability to occupational choices of adults. Vocational Guidance Magazine, 10:354-358.

Gribbons, W. D. 1964. Changes in readiness for vocational planning from the eighth to the tenth grade. Personnel and Guidance Journal, 42:908-913.

Gribbons, W. D. and Lohnes, P. R. 1964. Relationships among measures of readiness for vocational planning. Journal of Counseling Psychology, 11:13-19.

Gribbons, W. D. and Lohnes, P. R. 1964a. Validation of vocational planning interview scales. Journal of Counseling Psychology, 11:20-25.

Gribbons, W. D. and Lohnes, P. R. 1966. Career Development. Report of Cooperative Research Project No. 5-0088, Regis College, Weston, Massachusetts.

Guilford, J. P. 1954. Psychometrics Methods, (2nd. Ed.). McGraw Hill Book Company, Inc., New York.

Guilford, J. P. 1965. Fundamental Statistics in Psychology and Education, (4th. Ed.). McGraw Hill Book Company, New York.

Havighurst, R. J. 1953. Human Development and Education. Longmans, Green, New York.

Hollingshead, A. B. 1949. Elmtown's Youth. Wiley, New York.

Jessor, R. and Hammond, K. R. 1957. Construct validity of the Taylor Anxiety Scale. Psychological Bulletin, 54:161-170.

Meehl, P. E. 1945. The dynamics of a "structured" personality test. Journal of Clinical Psychology, 1:296-303.

Nelson, A. G. 1956. Vocational maturity and client satisfaction. Journal of Counseling Psychology, 3:254-256.

Reynolds, L. G. and Shister, J. 1949. Job Horizons. Harper, New York.

Roe, Anne. 1956. The Psychology of Occupations. Wiley, New York.

Small, L. 1953. Personality determinants of vocational choice. Psychological Monographs, 67:1-21.

Sparling, E. 1933. Do college students choose vocations wisely? Contributions to Education. Bureau of Publications, Teachers College, Columbia University, New York.

Super, D. E. 1955. The dimensions and measurement of vocational maturity. Teachers College Record, 57:151-163.

Super, D. E. 1957. The Psychology of Careers. Harper, New York.

Super, D. E. 1963. The definition and measurement of early career behavior: A first formulation. Personnel and Guidance Journal, 30:775-780.

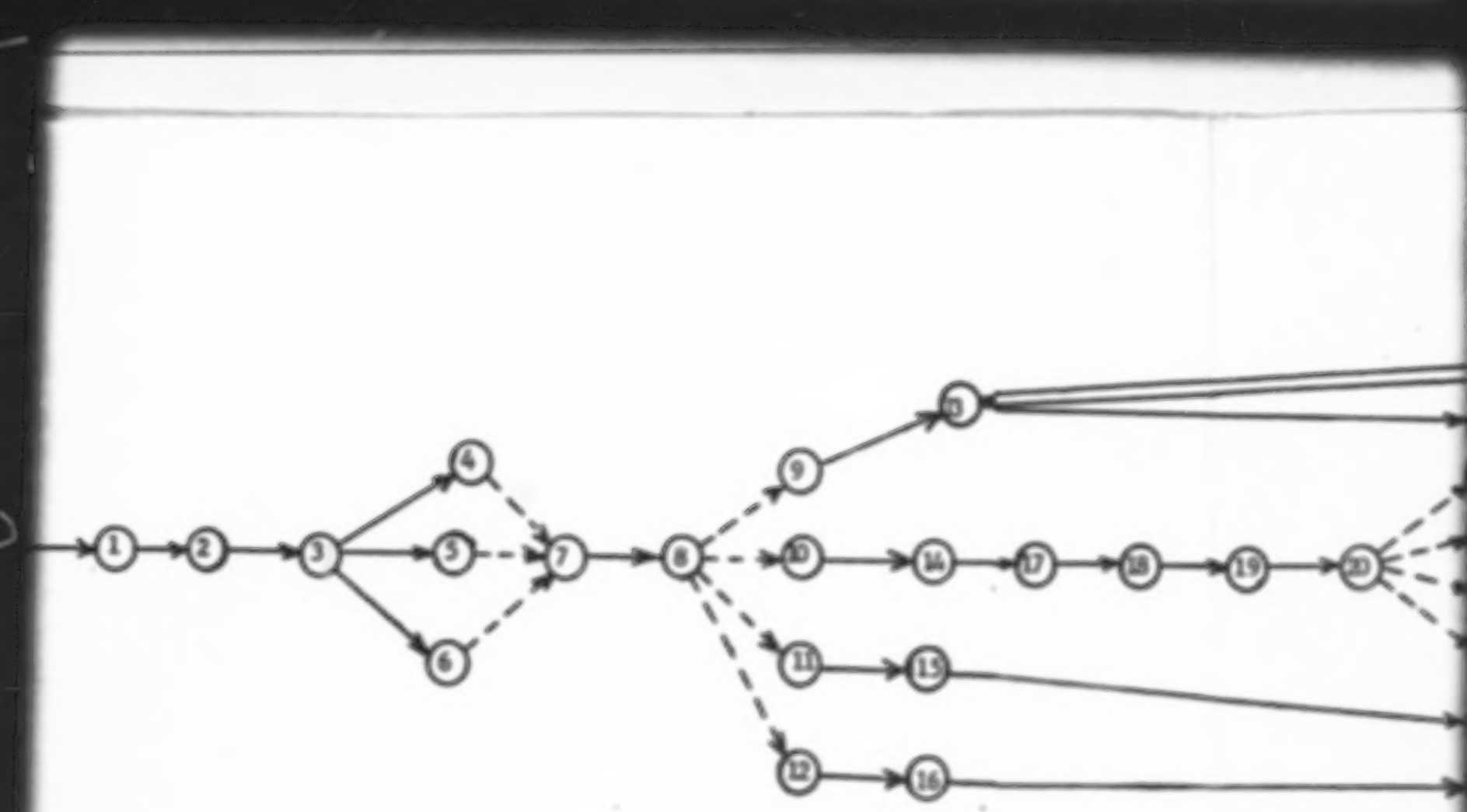
Super, D. E. 1964. Comment on two articles. Journal of Counseling Psychology, 11:25-26.

Super, D. E.; Crites, J. O.; Hummel, R. C.; Moser, Helen P.; Overstreet, Phoebe L.; and Warnath, C. F. 1957. Vocational Development: A Framework for Research. Bureau of Publications, Teachers College, Columbia University, New York.

Super, D. E. and Overstreet, Phoebe L. 1960. The Vocational Maturity of Ninth Grade Boys. Bureau of Public tions, Teachers College, Columbia University, New York.

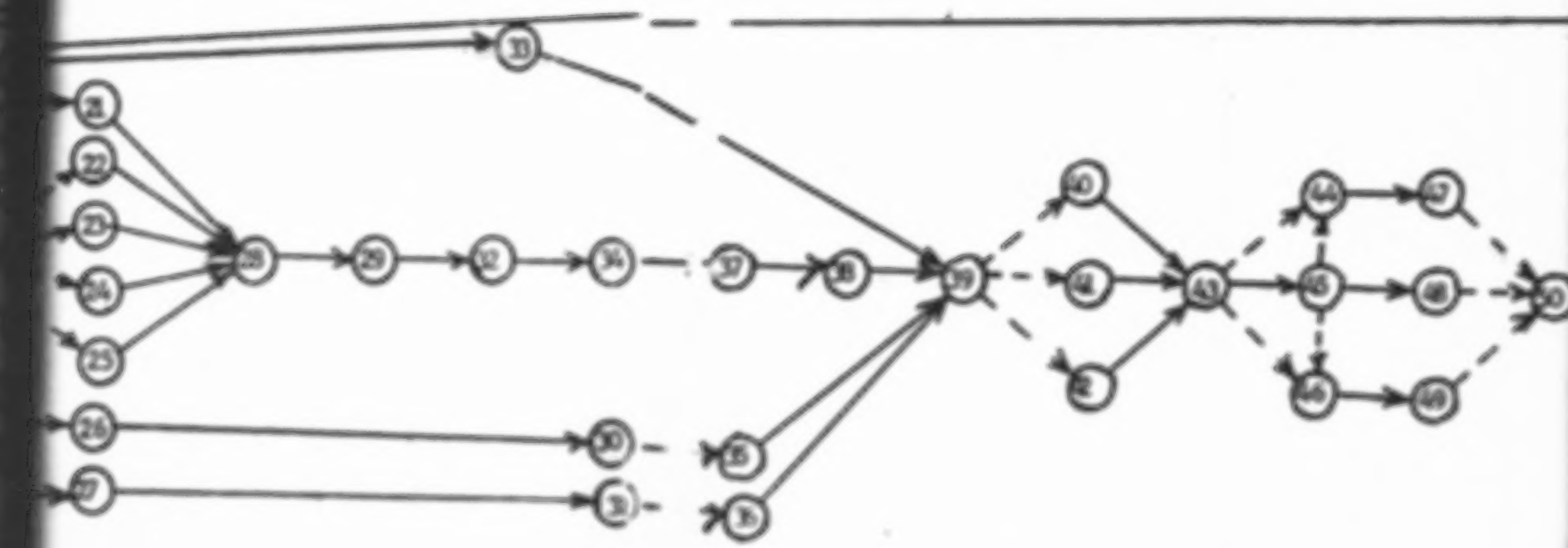
Wrenn, C. G. 1935. Intelligence and the vocational choices of college students. Educational Record, 16:217-219.

APPENDIX A



ACTIVITY KEY	ACTIVITY
-1	Write proposal introduction
-2	Write proposal methodology
-3	Review of proposal
-4	Analyze Super's scales
-5	Analyze Crites' scales
-6	Analyze Gribbons' scales
-8	Define VM variables
-13	Develop sampling plan
-14	Select item writers
-15	Questionnaire outline
-16	Identify criterion variables

ESTIMATED COMPLETION DATE	ACTIVITY KEY	A
4-26-67	14-17	Draft items
6-21-67	17-18	Review items
8-16-67	18-19	Revise items
11-16-67	19-20	Assemble tryout form
11-16-67	13-21	Select tryout sample
11-16-67	21-28	Select test administ
12-18-67	22-28	Student directions
8-13-68	23-28	Scoring procedures
12-29-67	24-28	Answer sheets
10-23-68	25-28	Administrator direct
1-22-68	15-26	Draft questionnaire
	16-27	Select criterion me
	28-29	Tryout administrati
	13-33	Select preliminary
	29-32	Score instruments
	26-30	Review questionnair
	27-31	Obtain criterion in
	32-34	Item analysis



ACTIVITY	ESTIMATED COMPLETION DATE	ACTIVITY KEY	ACTIVITY
	4-8-68	30-35	Questionnaire approval
	6-18-68	31-36	Prepare administration schedule
	7-16-68	34-37	Item selection
rm	7-30-68	37-38	Assemble preliminary form
le	8-27-68	38-39	Revise directions
trators	9-11-68	33-39	Select test administrators
	8-27-68	35-39	Mimeograph questionnaire
	7-30-68	36-39	Package criterion instruments
	8-27-68	40-43	Administer preliminary form
tions	8-27-68	41-43	Administer criterion instruments
	11-6-68	42-43	Administer questionnaire
asures	11-29-68	43-45	Score preliminary form
ion	9-18-68	44-47	Item analysis
sample (cross validation)	1-17-69	45-48	Reliability estimate
	10-2-68	46-49	Validity coefficient
re	11-20-68	50-51	Item selection
struments	1-17-69		
	12-20-68		

PERT NETWORK FOR VOCATIONAL MATURITY PROJECT

ESTIMATED COMPLETION DATE	ACTIVITY KEY	ACTIVITY
1-24-69	13-52	Select standardization sample
1-24-69	52-55	Select test administrators
1-10-69	51-53	Assemble final form
1-17-69	53-54	Revise questionnaire
1-31-69	54-55	Revise directions
1-31-69	56-59	Administer final form
1-31-69	57-59	Administer questionnaire
1-31-69	58-59	Administer criterion instruments
2-28-69	59-60	Score final form
2-28-69	61-65	Item analysis
2-28-69	62-65	Reliability estimate
4-18-69	63-65	Validity coefficient
7-11-69	64-66	Technical manual outline
7-11-69	67-68	Prepare technical manual
7-11-69		
7-25-69		

ESTIMATED COMPLETION DATE	ACTIV KEY
8-15-69	68-
9-29-69	69-
8-1-69	70-
8-15-69	71-
8-29-69	72-
9-26-69	73-
9-26-69	
9-26-69	
10-31-69	
1-13-70	
1-13-70	
1-13-70	
1-13-70	
2-3-70	

PROJECT

ESTIMATED COMPLETION DATE	ACTIVITY KEY	ACTIVITY	ESTIMATED COMPLETION DATE
8-15-69	68-69	Prepare preliminary draft of report	3-10-70
9-29-69	69-70	Mimeograph preliminary report	3-24-70
8-1-69	70-71	Formal technical review	5-5-70
8-15-69	71-72	Revise preliminary draft	5-26-70
8-29-69	72-73	Prepare final report	6-9-70
9-26-69	73-74	Duplicate final report	6-23-70
9-26-69			
9-26-69			
10-31-69			
1-13-70			
1-13-70			
1-13-70			
1-13-70			
2-3-70			